to give $f=$ the elasticity in inches of mercury for temp. Fahr., he gives a table of f for every degree from $-40°$ to $+360°$, by the help of which he compares with his formula, the experiments of Robison, Southern, Dalton, Taylor, Arsberger, Ure, and those of the American Committee, and shows that they differ more widely from each other than from the formula.

Considering the care bestowed to ensure the elasticities being correctly measured, the author is disposed to attribute a great part, but not the whole, of the discordance on the several results to errors in the measures of temperature arising from smallness of scale or incorrectness of division.

February 24, 1848.

GEORGE RENNIE, Esq., Treasurer, in the Chair,

"On the Moist-Bulb Problem." By Captain Shortrede. Communicated by Lieut.-Colonel W. H. Sykes, F.R.S.

The author adopts the notation of Professor Apjohn, and by a similar method deduces the fundamental equation, which is then translated into numbers, taking 1175° F. as the sum of the latent and sensible heats, 0·267 as the specific heat of dry air, the weight of aqueous vapour as five-eighths of that of air, and its specific heat $=0·867$, that of water being unity.

The coefficient for barometric pressure is resolved into a simple change on the temperature of the air, and consequently also on the depression of the moist bulb; and the equation is put into a shape convenient for use, and shown to be free from objection. The author uses the table of the force of vapour, given in the accompanying preceding paper, and then gives a table of maximum depressions for every degree of the moist bulb from $-40°$ to 212°, and another table interpolated from it for every degree of temperature of the air from 0° to 212°.

Gay-Lussac's depressions are then compared with those of the new formula; and the errors are shown to be almost insensible near the freezing-point, but increasing gradually, till at 25 Cent. it is about 10 per cent. The author attributes these errors to the gradual deterioration of the chloride of lime during the experiments.

The author then compares Prinsep's maximum depressions collected and given in vol. v. of the Journal of the Asiatic Society of Bengal. The observed depressions are generally below those given by the new formula, like those of Gay-Lussac. The errors on those where the air was heated by a steam-pipe, are not greater than on those at natural temperatures; and that with air passing through a porcelain tube at an orange heat, falls within the limits assigned by Prinsep in estimating the temperature of the air.

Apjohn's maximum depressions are then compared with the new formula. And here the errors are of an opposite character to those preceding, which the author attributes to the lowering of tempera-

ture occasioned by expansion on escaping from the compression used to force the air in a rapid current through the apparatus. Apjohn's dew-point observations are then compared, and the errors are found to be similar to the preceding, and apparently from the same cause.

To make the formula generally useful, the author gives a table of the depression of dew-point below temperature for every degree of depression of the moist bulb, at every 5° of temperature from 0° to 100°, and for every 10° from 100° to 140°, which he protracts on a chart, so as to give the dew-point in every case with little more trouble than is required for reading a common thermometer, and also at the same time the elasticity of vapour in the atmosphere.

"Experiments on the influence of Magnetism on Polarized Light." By Professor Carlo Matteucci. Communicated by Sir John F. W. Herschel, Bart., V.P.R.S. &c.

The object of this notice is to communicate some recent experiments on diamagnetism, and particularly on the influence of magnetism on polarized light. The following extracts are in the words of the author:—

"The apparatus I employed in these experiments was an electro-magnetic apparatus invented by M. Rumkorf, and described by M. Biot at a meeting of the Academy of Sciences of Paris, and consisting of a powerful electro-magnet, of which the soft iron cylinder is traversed by a hole in the direction of the length of the axis, through which hole the ray of polarized light is made to pass; and the voltaic current which I employed on this occasion was that of seven pair of Grove's construction. I made my first experiment with a piece of *heavy glass*, which I received from Faraday himself. In order to assure myself of the exact amount of rotation induced by magnetic action, I caused the ray of light, before it reached the heavy glass, to pass through the system invented by M. Soleil, consisting of two equal plates of perpendicular quartz, placed side by side; the one turning to the right, the other to the left. I ascertained, first of all, the rotation produced by making the current pass sometimes in one direction, and sometimes in the other; the two rotations, one to the right, the other to the left, thus produced, were exactly the same. Then I compressed slightly the middle part of the piece of heavy glass, in the same manner as one compresses pieces of glass. I was then obliged to turn the eyepiece in a certain direction in order to restore the image to its first condition; in my experiments I always had to turn it, after compression, towards the right. I next made the current pass, first in one direction, then in the other. The general facts which I have observed constantly and without exception are the following:—*The rotation produced by the magnet on the compressed piece of heavy glass is not the same to the right as it is to the left: the rotation produced by the magnet is considerably greater in the direction of the rotation produced by compression than it is in the contrary direction: the rotation produced by the magnet on the compressed heavy glass, and in the direction of the rotation produced by the compression, is greater than that produced by the same magnet on glass*